FURUNO

OPERATOR'S MANUAL

取 扱 説 明 書

GPS RECEIVER

GPS受信機

Model **GP-330B**

Part no. 17-468-01 rev. 04

FURUNO ELECTRIC CO., LTD.

www.furuno.com

IMPORTANT NOTICES

General

- This manual has been authored with simplified grammar, to meet the needs of international users.
- The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.
- Do not copy any part of this manual without written permission from FURUNO.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications can change without notice.
- The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.
- Save this manual for future reference.
- Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.
- All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

How to discard this product

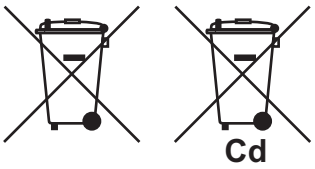
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery, see the chapter on Maintenance. Follow the instructions below if a battery is used. Tape the + and - terminals of battery before disposal to prevent fire, heat generation caused by short circuit.

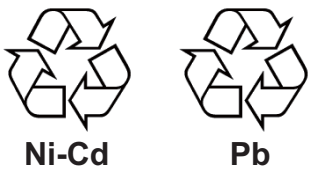
In the European Union

The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive 2006/66/EU.



In the USA

The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the used batteries to a battery collection site according to local laws.



In the other countries

There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycle symbols in the future.

SAFETY INSTRUCTION

The operator of this equipment must read these safety instructions before attempting to operate the equipment.

WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Warning, Caution Prohibitive Action Mandatory Action

WARNING

Always wear safety goggles and a dust mask when installing to avoid personal injury.

CAUTION

The input voltage shall be 12 VDC.

Any other input voltage can damage the equipment.

Make power connections to a 12 VDC power source that is isolated from the engine start battery(s).

Voltage drop may cause the GPS receiver to lose information and/or change operating mode.

A safe installation requires a 0.5 amp fast-blow fuse or circuit breaker.

CAUTION

Do not disassemble the unit.

Disasembling the unit will damage the waterproof seal. Further, there are no user-serviceable parts inside.

GPS position and velocity accuracies are controlled by the U.S. Department of Defense. Therefore, the position accuracy described in the specifications cannot be guaranteed.

No one navigation device should ever be solely relied upon for the navigation of a vessel.

Always confirm position against all available aids to navigation, for safety of vessel and crew.

The compass safe distance for standard and steering compasses is 0.30 m.

Observe this distance to prevent inteference to a magnetic compass.

TABLE OF CONTENTS

Note: This manual contains both English and Japanese instructions. The Installation Materials, Outline Drawings, and Interconnection Diagram are located at the back of this manual.

FOREWORD iv
SYSTEM CONFIGURATION v

1. INSTALLATION 1
1.1 Equipment Lists 1
1.2 Tools & Materials 1
1.3 Choosing the Mounting Location 2
1.4 Mounting 3
1.4.1 Pole/Rail (Pipe) Mount 3
1.4.2 Deck Mount 4
1.4.3 Flush Mount 5

2. WIRING, SETTINGS 6
2.1 CAN bus Connection 6
2.1.1 Direct Connection 6
2.1.2 Network Connection 7
2.1.3 Routing and Connecting the Cable Assembly 8
2.2 NMEA 0183 Connection 9
2.3 Settings for NavNet vx2 10

3. MAINTENANCE, TROUBLESHOOTING 11
3.1 Maintenance 11
3.2 Troubleshooting 11

4. TECHNICAL INFORMATION 12
4.1 NMEA 0183 Sentence 12
4.2 NMEA 2000 PGN Commands 13

SPECIFICATIONS SP-1
INSTALLATION MATERIALS A-1
OUTLINE DRAWINGS D-1
INTERCONNECTION DIAGRAM S-1

FOREWORD

A Word to the Owner of the GP-330B

Congratulations on your choice of the FURUNO GP-330B GPS Receiver. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for quality marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

This equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless installed, operated and maintained properly. Please carefully read and follow the recommended procedures for installation and maintenance.

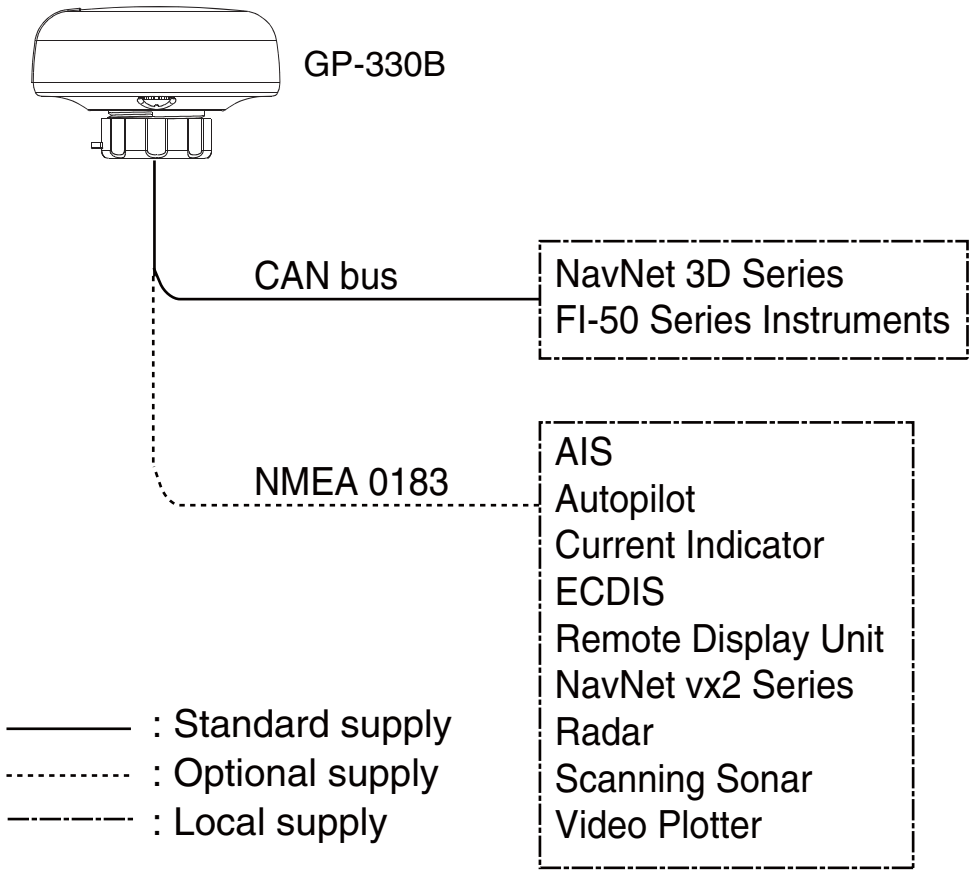
Thank you for considering and purchasing FURUNO equipment.

Feature

The GP-330B is a high performance GPS Receiver designed for any type of vessel. This compact and cost-effective receiver offers extremely accurate position fixes, within 3 meters with the WAAS mode activated.

- 65 channels for receiving 12 satellites simultaneously
- Output in CAN bus or NMEA 0183 format
- Position fixed within approx. 60 seconds after start up
- Position updated every second
- Space-saving installation
- Ideal position-fixing sensor for NavNet 3D series

SYSTEM CONFIGURATION



1. INSTALLATION

1.1 Equipment Lists

Name	Type	Code No.	Qty	Remarks
Standard Supply				
GPS Receiver	GP-330B		1	
Installation Materials	CP20-03200	000-012-581	1 set	With CAN bus cable (6 m)
	CP20-03210	000-012-582	1 set	No cable
Optional Supply				
Cable Assy.	33-1209-01	001-193-460-10	1	6 m, for CAN bus
Cable Assy.	33-1209-02	001-193-470-10	1	10 m, for CAN bus
Cable Assy.	22-910-03	001-163-140-10	1	10 m, for NMEA 0183
Cable Assy.	MJ-A7SPF/ SRMD-100	000-144-534-11	1	10 m, straight, MJ7P(P)-MJ7P(J), for NMEA 0183
Flush Mount Kit	GP-330B-FLUSH KIT	001-037-630	1	
Deck Mount Kit	GP-330B-DECK KIT	001-037-640	1	
Pipe Mount Kit	GP-330B-PIPE KIT	001-041-560	1	

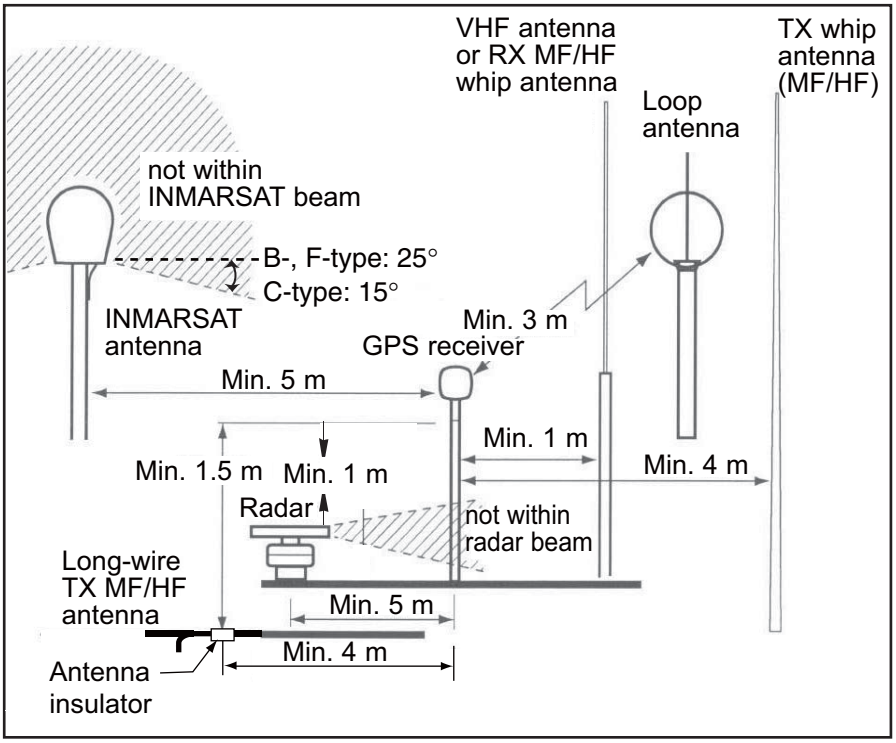
1.2 Tools & Materials

- Mounting hardware with standard 1-14" UNS (Pole/Rail Mount installation) threads
- Safety goggles
- Dust mask
- Screwdrivers (Pole/Rail Mount or Deck Mount installation)
- Teflon pipe thread tape, 1/2" wide (some installations)
- Pencil (some installations)
- Electric drill (some installations)
- Drill bits (some installations):
  - Pilot hole - 3 mm or 1/8"
  - Deck mount screw holes - 5.1 mm or #7
  - Deck mount cable hole - 25 mm or 1”
  - Flush mount stud holes - 6 mm or 1/4”
  - Flush mount cable hole - 38 mm or 1-1/2”
- Loctite 242 or removable thread locker (Flush Mount installation)
- Cable ties (some installations)

1.3 Choosing the Mounting Location

For a reliable GPS signal, selecting the best location for the receiver is very important. It can be mounted on a pole, rail, or flat surface. Choose a location that balances the requirements below.

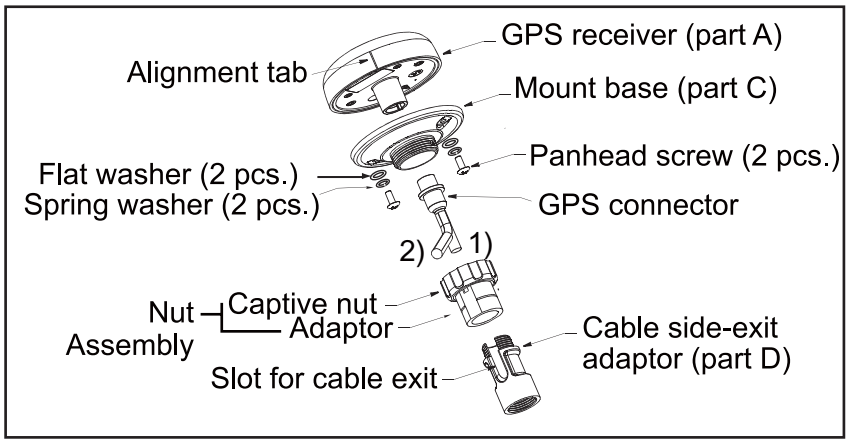
- The GPS receiver must have a clear view of the sky to the horizon in all directions. *Note* that frozen water spray may degrade reception.
- Referring to the figure below for distances, mount away from any VHF radio, satellite communications equipment, radar, or other antennas to avoid mutual interference.
- Mount above or below any radar beam. *Do not* mount within a radar beam.
- Mount reasonably level with the earth's surface -- *not* tilted to one side.
- *Do not* mount on top of a sailboat mast. The sway will cause jitter in the data.
- *Do not* mount where the GPS receiver could be a tripping hazard or tread upon.
- Be sure there is access to the underside of the mounting surface.
- Be sure the cable(s) can be routed to reduce electrical interference from other electrical wiring and any equipment with a strong magnetic field such as radar, radio transmitters, engines, generators, etc. Separate the cables by at least 1 meter (3 feet).



1.4 Mounting

1.4.1 Pole/Rail (Pipe) Mount

CAUTION! - Do not use the flush mount materials to mount the unit on a pole. Water may leak into the unit.

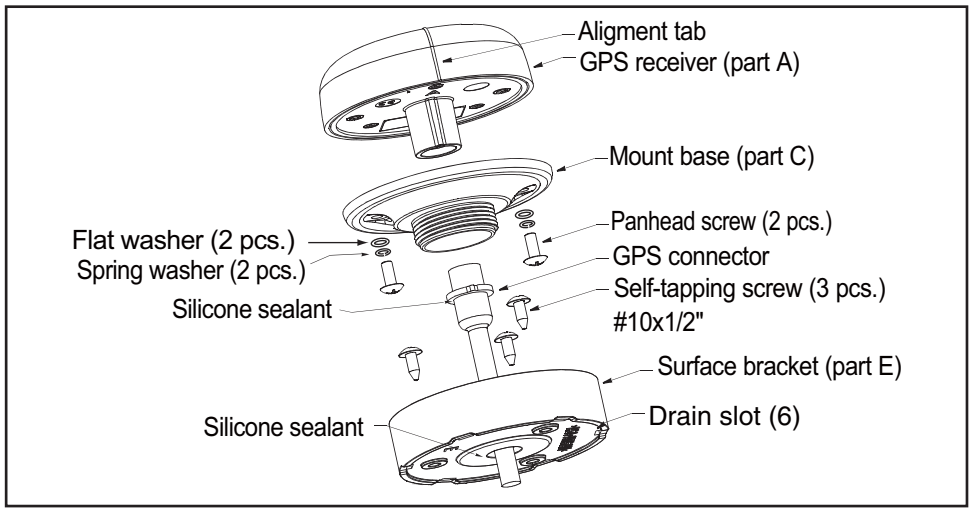


The nut assembly supplied has standard 1-14" UNS threads that can be screwed to a standard marine antenna mount, extension pole, or rail-mount bracket. Before beginning the installation, plan for securing the pole/rail bracket to the boat and purchase locally all the necessary hardware. It may be helpful to fasten the pole/rail bracket to the boat before proceeding.

1. Unscrew the mount base (part C) from the surface bracket (part E). (The surface bracket is not used in this installation. See the next page for part (E)).
2. Remove the label from the GPS receiver's socket (underside of receiver). The label may be discarded.
   Fasten the mount base (part C) to the GPS receiver (part A) with the supplied two panhead screws, flat washers and spring washers. The torque for the screws is 1.35 N•m.
3. Decide if you want the cable to exit through the center or along the side of the pole/rail bracket. Slide the nut assembly (captive nut and adaptor) onto the cable at the 9-pin *GPS* connector end. *Do not connect the GPS receiver at this time.*
   1) **Center exit:** Pass the *instrument* connector end of the cable down through the center of the pole. *Be sure to leave several inches of cable extending beyond the nut assembly.*
   2) **Side exit:** Place the cable side-exit adaptor (part D) over the cable. *Being sure the cable is passing through the slot in the side*, screw the nut assembly onto the adaptor. **Hand-tighten only**. *Do not* over tighten.
      Note: Use the adaptor supplied as it has smooth edges that will *not* chafe the cable. *Do not* use a purchased part.

   CAUTION: if you use a thread locker, use teflon pipe thread tape. Do not use a liquid thread locker as it may weaken the plastic, causing it to swell and crack.
4. Screw the extension pole/rail bracket onto the nut assembly/cable side-exit adaptor. **Hand-tighten only**. *Do not* over tighten.
5. Remove the protective cap from the GPS connector on the cable. (Save the cap to protect the connector, when the receiver is removed.) Plug the cable firmly into the GPS receiver.
6. With the alignment tab on the GPS receiver facing forward, slide the captive nut upward and screw it onto the mount base. **Hand-tighten only**. *Do not* over tighten.

1.4.2 Deck Mount

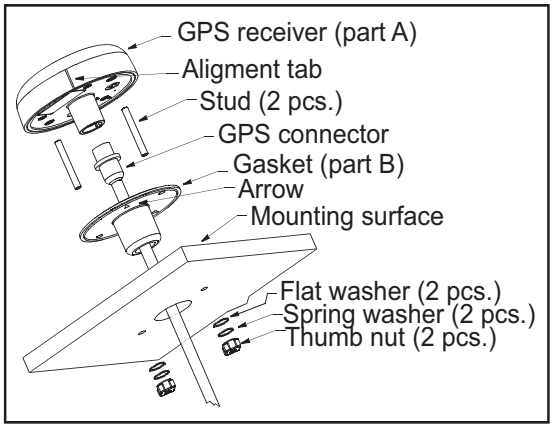


See the outline drawing for mounting hole dimensions and fixing instructions

1. Unscrew the mount base (part C) from the surface bracket (part E) (see figure above). Remove the label from over the GPS receiver's socket. (The label may be discarded.) Fasten the mount base (part C) to the GPS receiver (part A) with the supplied panhead screws, flat washers and spring washers. The torque for the screws is 1.35 N•m.
2. Screw the surface bracket (part E) onto the mount base of the assembled GPS receiver. Use a pencil to extend the alignment tab onto the surface bracket. Unscrew the surface bracket.
3. At the selected location, position the surface bracket with the pencil mark facing forward. Using it as a template, mark the position for the three mounting screws and the center hole for the cable.
4. Using a 3 mm or 1/8" bit, drill the pilot holes. Using 5.1 mm or #7 bit, drill the three mounting holes. Drill the cable hole with a 25 mm or 1" bit.
   Fiberglass-Minimize surface cracking by running the drill in reverse until the gelcoat is penetrated.
5. At the location shown in the figure above, coat the surface bracket (part E) with silicone sealant.
6. Apply silicone sealant to the three #10 x 1/2" self-tapping screws to seal the deck. With the pencil mark facing forward, fasten the surface bracket in place. *Do not block the drain slots*. They will allow any water that accumulates inside the surface bracket to escape. **CAUTION:** Do not use a liquid thread locker as it may weaken the plastic, causing it to swell and crack.
7. Wrap pipe thread tape around the threads of the mount base two times to seal it tightly to the surface bracket.
8. Coat the part of the GPS connector shown in the figure on page 4 with silicone sealant. Pass the GPS connector end of the cable up through the hole in the surface bracket.
9. Remove the protective cap from the cable's GPS connector. (Save the cap to protect the connector, when the receiver is removed.) Plug the cable firmly into the GPS receiver.
10. Counterclockwise twist the cable three and one-half turns. Then screw the GPS receiver onto the installed surface bracket. **Hand-tighten only**. *Do not* over tighten.

1.4.3 Flush Mount

See the outline drawing for mounting hole dimensions and fixing instructions.



1. Remove the label from over the GPS receiver's socket. (The label may be discarded.) Apply *removable* thread locker to the two studs supplied. Screw the studs into the underside of the GPS receiver (part A).
2. Using the gasket (part B) as a template, position it at the selected mounting location *upside down* with the arrow facing forward. Mark the position for the two mounting holes and the center hole for the cable.
3. Using a 3 mm or 1/8" bit, drill the pilot holes. Using a 6 mm or 1/4" bit, drill the two mounting holes for the studs. Drill the cable hole with a 38 mm or 1-1/2" bit.
   Fiberglass-Minimize surface cracking by running the drill in reverse until the gelcoat is penetrated.
4. Pass the *instrument* connector-end of the cable through the center of the gasket and down through the center mounting hole in the boat.
5. Plug the cable firmly into the GPS receiver.
6. Orient the gasket with the arrow facing in the same direction as the alignment tab on the GPS receiver. Push the gasket onto the studs and slide it over the connector.
   Note: The gasket fits one way only. A groove in the gasket fits over the alignment tab on the connector.
7. With the GPS receiver alignment tab pointing forward, push the studs through the mounting surface. *Check to be sure the gasket is tucked under the lip of the unit.* From underneath the mounting surface, slide the flat washer and spring washer onto each stud. Fasten the studs with the thumb nuts. **Hand-tighten** only. *Do not* over tighten.
8. Coat the circumference of the GPS receiver with silicone sealant so that there is no space between the GPS receiver and the mounting surface.

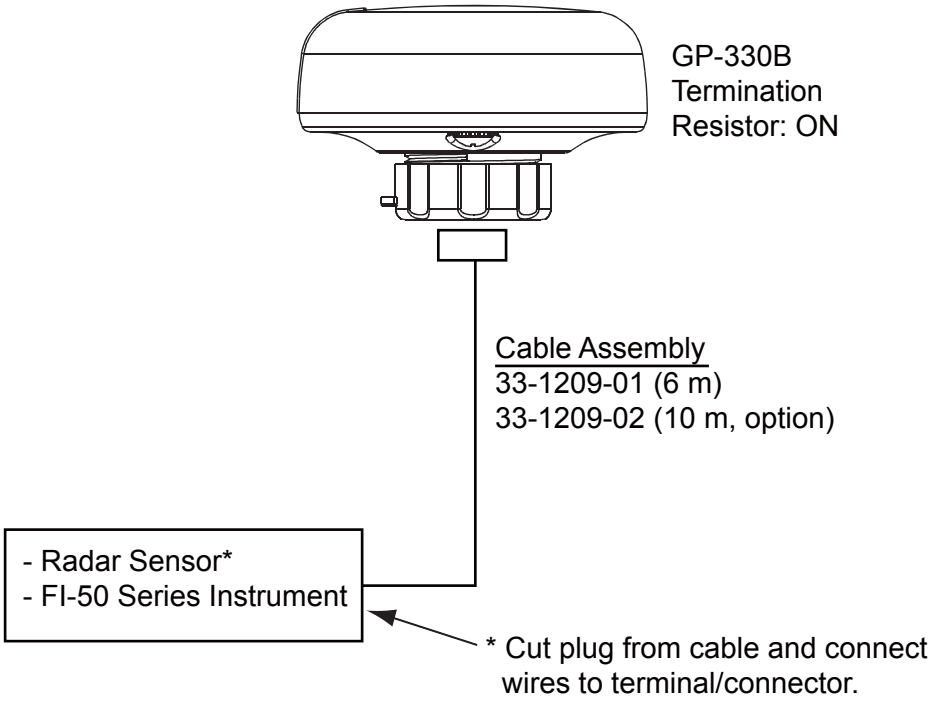
2. WIRING, SETTINGS

2.1 CAN bus Connection

The LEN (Load Equivalency Number) for this equipment is 2.

2.1.1 Direct Connection

Insert the contact pin (supplied) into the #5 socket of the GPS Receiver connector to activate the termination resistor. (See page 8 for location of #5 socket.) Route the cable assembly to the CAN bus device. Coil any excess cable and secure it with a cable tie to prevent damage. Connect the cable assembly to the CAN bus device.

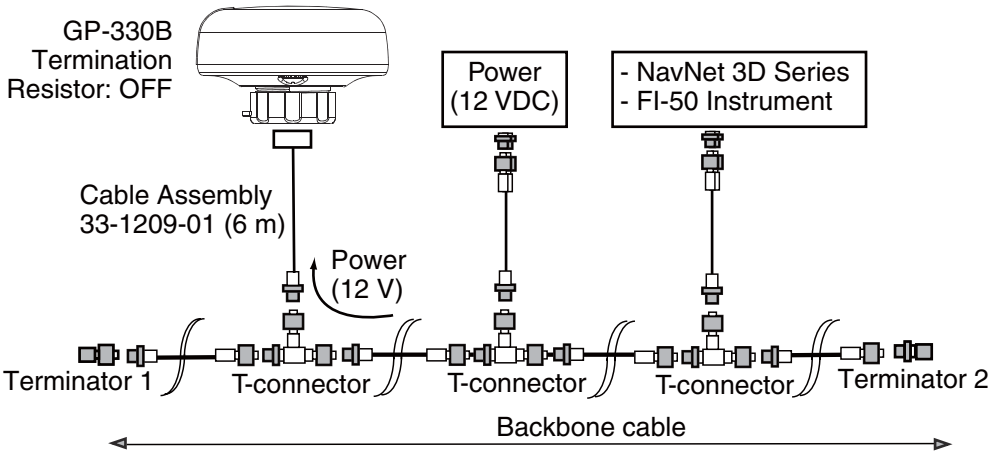


2.1.2 Network Connection

Drop cable connection

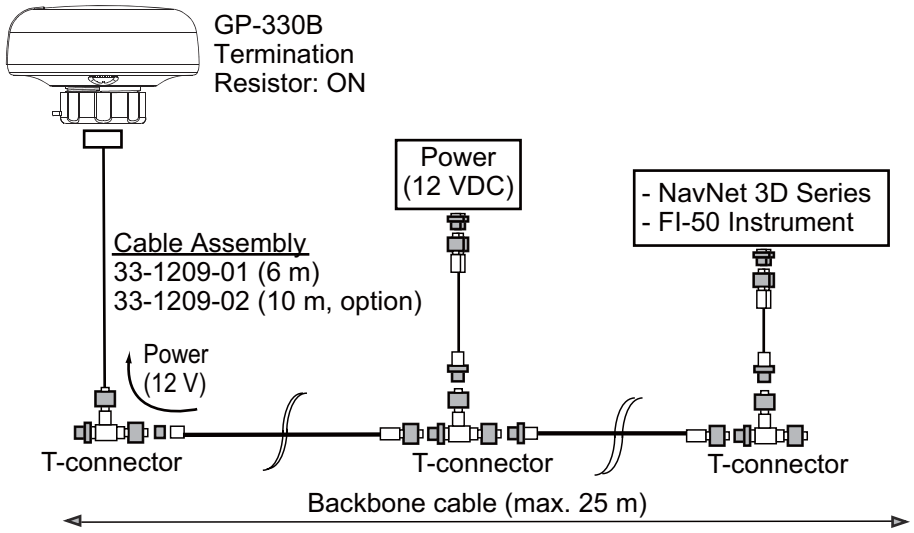
A drop cable is connected to a backbone cable with T-type connectors*. The backbone cable is of the "light" type. Attach a terminator at the ends of the backbone cable. *Only two termination resistors are required on an CAN bus network. More than two will degrade performance.*

* Recommended type: LTWSS-050505-FMF-TS001 (LTW Technology, Inc.), or equivalent

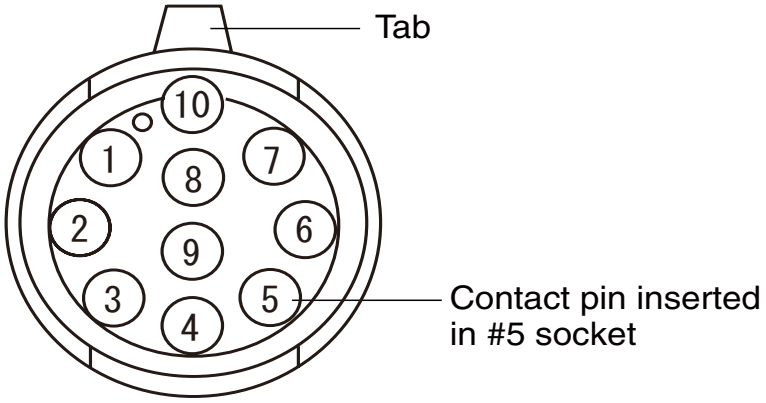


Backbone cable connection

Use this connection method to connect the GP-330B at the final node in the backbone cable. Use T-type connectors to connect equipment to the backbone cable.



Connect the GPS Receiver at the last node in the network. Insert the contact pin (supplied) into the #5 socket of the GPS Receiver connector to activate the termination resistor.

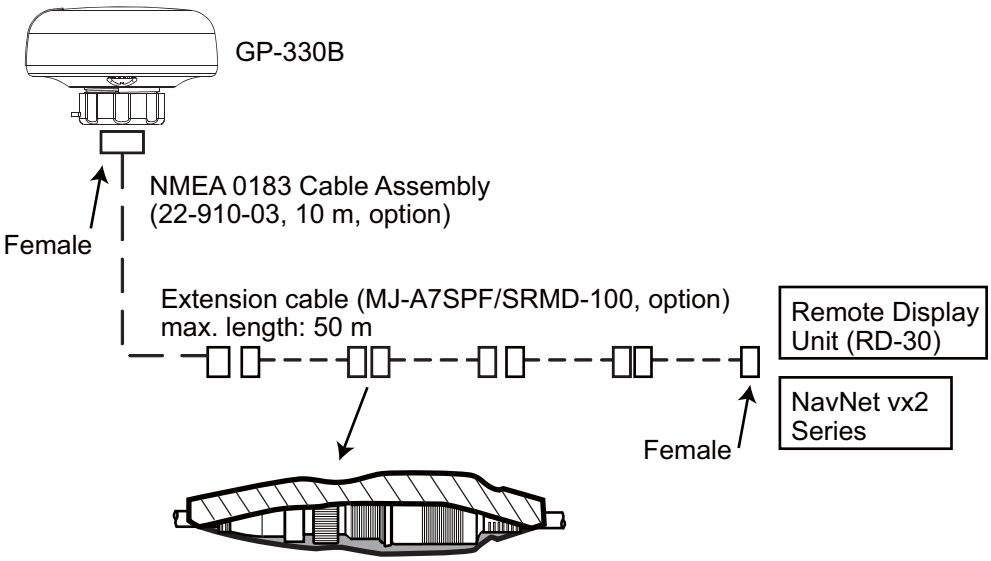


2.1.3 Routing and Connecting the Cable Assembly

Route the cable assembly to the CAN bus device. Coil any excess cable and secure it with a cable tie to prevent damage. Connect the cable assembly to the CAN bus device.

2.2 NMEA 0183 Connection

Wiring outline



Waterproof connectors by wrapping them with vulcanizing tape and then vinyl tape. Bind tape ends with suitable cable ties.

Wiring procedure

Route the cable assembly to the display. Coil any excess cable and secure it with a cable tie to prevent damage. Connect the GPS Receiver to your NMEA 0183 display.

2.3 Settings for NavNet vx2

The following items in the NavNet vx2 menu system are applicable to the GP-330B. For details and operating procedure, see the Installation Manual for your NavNet vx2 model.

NAV SETUP menu

Set POSITION SOURCE to GPS or ALL.

GPS SETUP menu

- GEODETIC DATUM
  Select your chart type. WGS-84 is the GPS standard.
- FIX MODE
  Set position fixing mode to 2D/3D (three or four satellites in view).
- COLD START
  Clear the Almanac currently stored in the GPS receiver to receive the latest Almanac.

WAAS SETUP menu

- WAAS MODE
  Select ON to use the WAAS mode.
- WAAS SEARCH
  Set WAAS satellite search method to automatic.
- CORRECTIONS DATA
  Select the type of message for WAAS connection, 00 for North America, 02 elsewhere.

WAAS settings effective from the version numbers shown below.

C-MAP specification		NAVIO specification	
Program No.	Model	Program No.	Model
1950026-03.02	Model 1804C-BB	1950025-03.02	Model 1804C-BB
1950024-03.02	Model 1804C	1950023-03.02	Model 1804C
1950028-03.02	Model 1704C	1950027-03.02	Model 1704C

3. MAINTENANCE, TROUBLESHOOTING

⚠ CAUTION

Do not disassemble the unit.

Disassembling the unit will damage the waterproof seal. Further, there are no user-serviceable parts inside.

Do not immerse in water or pressure wash.

Doing so may allow water to infiltrate the sensor, voiding the warranty.

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

3.1 Maintenance

The GP-330B is virtually maintenance free. However, it is recommended to wipe it with a water-moistened cloth periodically to remove accumulated dirt and water deposits.

3.2 Troubleshooting

If position is not found within a reasonable amount of time, check the following items.

- Is there power to the GPS receiver? (Check unit that is supplying power to the GP-330B.)
- Are all the connections tight?
- Does the GPS receiver have a clear view of the sky?
- Is there interference from other antennas or instruments?
- Is cabling damaged?
- Is the cable-run free of kinks or damage?
- Is there damage to the GPS receiver?
- Is there ice on the GPS receiver?

4. TECHNICAL INFORMATION

4.1 NMEA 0183 Sentences

Transmitted NMEA 0183 Sentences

$GPDTM*	Datum Reference
$GPGGA*	GPS Fix Data
$GPGLL*	Geographic Position -Latitude / Longitude
$GPGSA	GNSS DOP and Active Satellites
$GPGSV	GNSS Satellites in View
$GPRMC*	Recommended Minimum Specific GNSS Data
$GPVTG*	Course Over Ground and Ground Speed
$GPZDA*	Time and Date
$PFEC,pidat	Response to $PFEC,pireq

* Default output

Received NMEA 0183 Sentences and Commands

$PAMTC,BAUD	Change the baud rate from the nominal 4800 baud to 38400 baud
$PAMTC,EN	Enable/disable transmission of specific sentences, and change their rate of transmission
$PAMTC,ERST	Reset the user portion of nonvolatile EEPROM to factory defaults
$PAMTC,OPTION	WAAS ON/OFF. Set 3d/Auto mode.
$PAMTC,POST	Set Query Power On Self Test function
$PAMTC,QPS	Query part number and serial number versions
$PAMTC,QV	Query GPS hardware and firmware versions
$PAMTC,RESET	Reset the GP-330B
$PAMTC,SIM	Enable/disable Simulate Mode
$PAMTX	Pause or resume all automatic transmission of messages
$PFEC,pireq	Request to $PFEC,pidat

4.2 NMEA 2000 PGN Commands

Transmitted NMEA 2000 PGNs

PGN 059392	ISO Acknowledgment
PGN 060928	ISO Address Claim
PGN 065285	Proprietary: Boot State Acknowledgment
PGN 065287	Proprietary: Access Level
PGN 126208	Acknowledge Group Function
PGN 126464	PGN List - Transmit/Received PGN's Group
PGN 126720	Addressable Multi-Frame Proprietary
PGN 126992	System Time
PGN 126996	Product Information
PGN 126998	Configuration Information
PGN 127258	Magnetic Variation
PGN 129025	Position, Rapid Update
PGN 129026	COG & SOG, Rapid Update
PGN 129029	GNSS Position Data
PGN 129033	Time & Date
PGN 129044	Datum
PGN 129538	GNSS Control Status
PGN 129539	GNSS DOPs
PGN 129540	GNSS Sats in View

Received NMEA 2000 PGNs

PGN 059904	ISO Request
PGN 060928	ISO Address Claim
PGN 126208	Request Group Function
PGN 126208	Command Group Function
PGN 126720	Addressable Multi-Frame Proprietary

SPECIFICATIONS OF GPS RECEIVER
GP-330B

1 GENERAL

1.1	Receiving frequency	1575.42 MHz
1.2	Tracking code	C/A code, WAAS
1.3	Number of channels	GPS: 65 channels parallel, 12 satellites; WAAS: 1 channel
1.4	Accuracy	GPS: 10m approx. (2drms)
		WAAS: 3m approx. (2drms)
1.5	Position fixing time	60 s typical (cold start)
1.6	Tracking velocity	999 kn
1.7	Position update interval	1 s (standard), 0.1 s (minimum)

2 INTERFACE

2.1	Type of data	CAN bus or NMEA0183 Ver.3.1 (selected by cable)
2.2	Data sentences (NMEA0183)	
	Output	DTM, GGA, GLL, GSA, GSV, RMC, VTG, ZDA
2.3	CAN bus PGN (NMEA2000)	
	Input	059904, 060928, 126208/720
	Output	059392, 060928, 065281/285/287,126208/464/720/992/996/998
		127258, 129025/026/029/033/044/538/539/540, 130822/823/944

3 POWER SUPPLY

12 VDC: 90 mA max.

4 ENVIRONMENTAL CONDITION

4.1	Ambient temperature	-25°C to +55°C
4.2	Relative humidity	95% or less at +40°C
4.3	Degree of protection	IP56
4.4	Bearing vibration	IEC 60945 Ed.4

5 UNIT COLOR

N9.5

重要なお知らせ

- 取扱説明書の一部または全部の転載、複写は著作権者である当社の許諾が必要です。無断転載することを固くお断りします。
- 製品の仕様ならびに取扱説明書の内容は予告なく変更することがあります。
- 画面に表示される内容は、システムの設定や動作状態によって異なります。したがって、本書内に掲載してあるイラストは画面の表示と異なる場合があります。
- お客様が本書の内容に従わずに本機または本ソフトウェアを取り扱われたり、または当社および当社指定の者以外の第三者により改造・変更されることに起因して生じる障害等については、当社は責任を負いかねますのでご了承ください。
- お買い上げの機器を廃棄するときは、産業廃棄物として地方自治体の条例または規則に従って処理してください。詳しくは、各地方自治体に問い合わせてください。
- 本マニュアルに記載されている社名、製品名は、一般に各開発メーカーの登録商標または商標です。

シリアル番号

⚠ 安全にお使いいただくために

必ずお守りください

お使いになる人や他の人への危害、財産への損害を未然に防止するため、以下のことを必ずお守りください。表示内容を無視して誤った使い方をしたときに生じる危害や損害の程度を、本書では次の表示で区分し、説明していますので十分に気をつけてください。

⚠ 警 告	この表示は「取扱いを誤った場合、死亡または重傷を負う可能性が想定される」内容です。
⚠ 注 意	この表示は「取扱いを誤った場合、中程度または軽傷の傷害、あるいは財産への損害を負う可能性が想定される」内容です。

⚠「注意喚起」の内容　⃠「禁止」の内容　❗「強制」の内容

⚠ 警 告

❗ **装備のときは、安全めがねと防塵マスクを使用すること。**

ケガの原因になります。

⚠ 注 意

❗ **電源はDC12Vを使用すること。**

規定外のものを使った場合、故障の原因になります。

❗ **電源はDC12Vはエンジン用電池とは別にすること。**

電圧降下により、GPS受信機が正しく作動しません。

⚠ **装備時には0.5Aの連断ヒューズ、またはブレーカーを用意すること。**

❗ **鉄の金属や、磁力を持つもののそばに近づけないこと。**

磁場により、方位磁石が正しく作動しない可能性があります。

⚠ 注 意

⃠ **分解・改造は絶対しないこと。**

防水シールがはがれる恐れがあります。また、火災、感電、ケガの原因になります。

⚠ **GPSによる位置/速度情報は、アメリカ合衆国国防省にて管理されています。仕様ページと一致しないことがあります。**

❗ **本機単独で航海しないこと。**

安全に航海するため、他の装置からの情報も確認してください。

❗ **次のコンパス安全距離を確保してください。**

コンパス安全距離を確保しないと、安全な操船ができない場合があります。

標準コンパス	操舵コンパス
0.3m	0.3m

目　次

はじめに iv

システム構成 v

1 章　装備 1

1.1　構成表 1
1.2　工具 1
1.3　取付け場所 2
1.4　取付け 3
1.4.1　パイプマウント 3
1.4.2　デッキマウント 4
1.4.3　フラッシュマウント 5

2 章　結線 6

2.1　CAN bus との接続 6
2.1.1　単独接続 6
2.1.2　ネットワーク接続 7
2.2　NMEA0183 との接続 8
2.3　NavNet との接続 8

3 章　保守点検 9

3.1　ふだんの保守点検 9
3.2　故障かなと思ったら 9

4 章　入出力センテンス、PGN 10

4.1　NMEA0183 センテンス 10
4.2　NMEA2000 PGN 11

仕様 SP-1

パッキングリスト A-1

外寸図 D-1

相互結線図 S-1

はじめに

このたびは、当社製品をお買い求めいただき、誠にありがとうございます。当社は 1948 年の創業以来、数々の舶用電子機器を製造販売しており、性能、品質、信頼性については全世界のユーザーの方々から高い評価を受けています。本機は、厳しい品質管理のもとで設計・製造されていますので、性能・耐久性ともに安心してご使用いただけます。この取扱説明書をよくお読みいただき、本来の性能を十分発揮させていただきますようお願い申し上げます。

特徴

GP-330B は様々な船に対応できる高性能な GPS 受信機です。本機は WAAS システムを利用すると、3 メートル以内の誤差で本船の位置を測位できます。

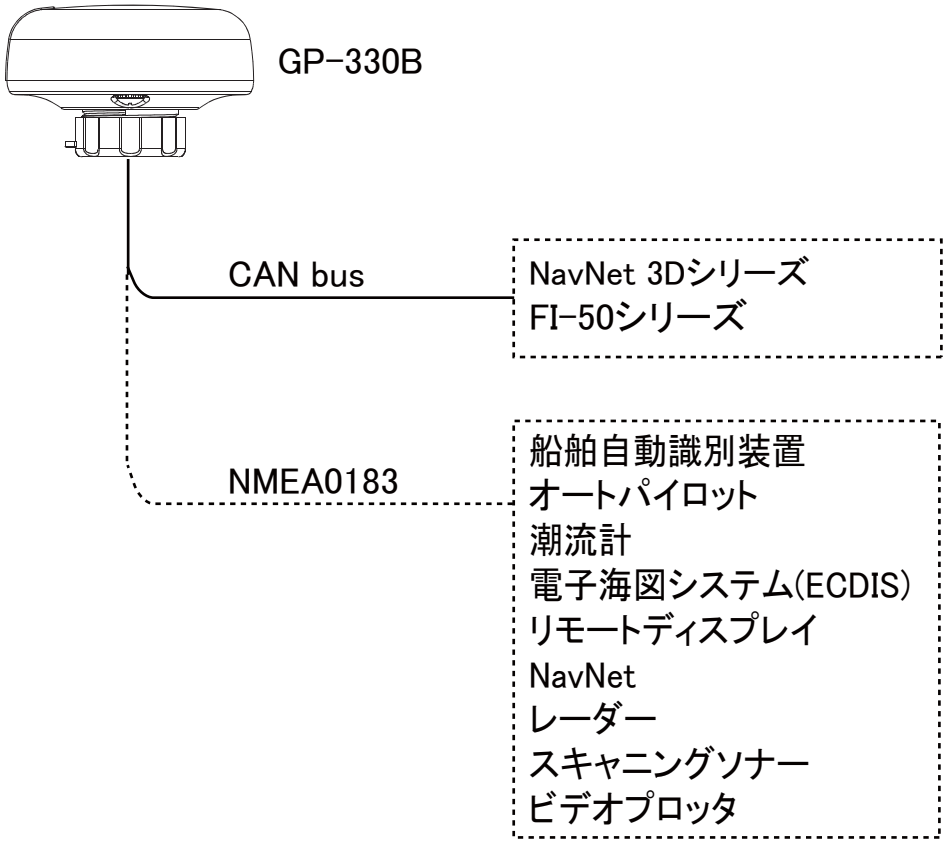
本機の主な特徴は次のとおりです。

- 同時に最大 12 個の衛星を追尾可能
- CAN bus や NMEA0183 形式で測位データを出力可能
- 測定開始から約 60 秒以内に船位確定
- NavNet 3D[*1] の測位センサーとして最適

*1：古野電気株式会社の登録商標

システム構成

基本構成を実線で表示します。



1 章　装備

1.1　構成表

名称	型式	コード番号	数量	備考
標準支給品				
GPS 受信機	GP-330B	-	1	
工事材料	CP20-03200	000-012-581	1 式	CAN bus 6m ケーブル付き
	CP20-03210	000-012-582	1 式	ケーブルなし
オプション				
ケーブル組品	33-1209-01	001-193-460-10	1	CAN bus 用、6m
ケーブル組品	33-1209-02	001-193-470-10	1	CAN bus 用、10m
ケーブル組品	22-910-03	001-163-140-10	1	NMEA0183 用、10m
ケーブル組品	MJ-A7SPF/ SRMD-100	000-144-534-11	1	NMEA0183 用 MJ7P(P)-MJ7P(J) ストレート、10m
フラッシュマウントキット	GP-330B-FLUSH KIT	001-037-630	1	
デッキマウントキット	GP-330B-DECK KIT	001-037-640	1	
パイプマウントキット	GP-330B-PIPE KIT	001-041-560	1	

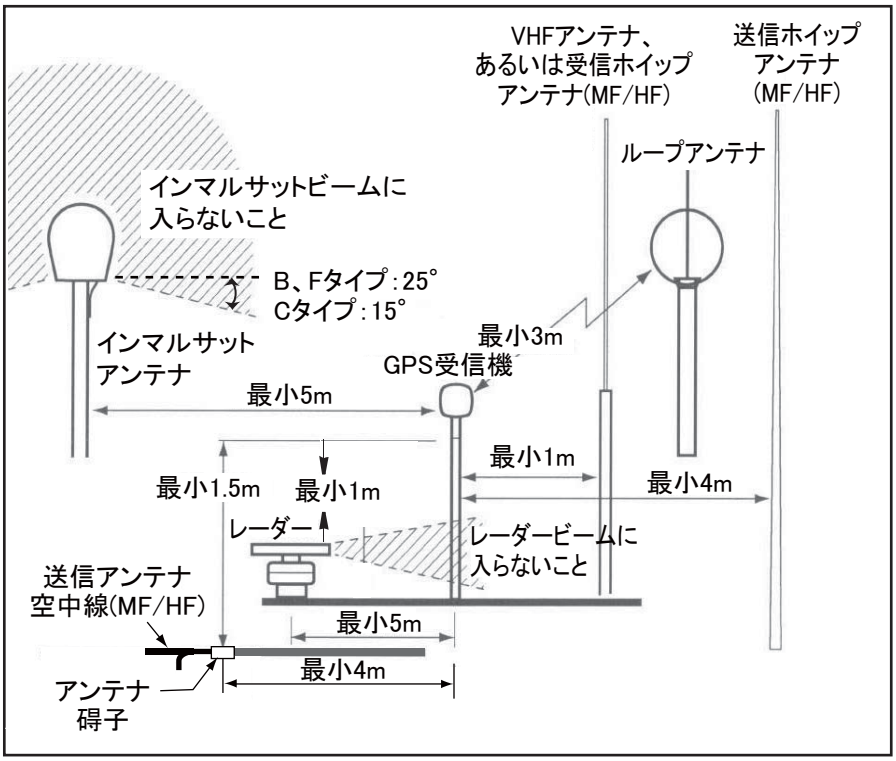
1.2　工具

- 1-14 UNS ネジ（ユニファイネジ）付き取付け金具（パイプマウントの場合）
- 安全メガネ
- 防塵マスク
- ドライバ（パイプ、デッキマウントの場合）
- テフロンパイプ用ネジテープ
- 鉛筆
- 電気ドリル
- ドリル錐
  - パイロット穴用：3mm
  - デッキマウントネジ穴用：5mm
  - デッキマウントケーブル穴用：25mm
  - フラッシュマウントボルト穴用：6mm
  - フラッシュマウントケーブル穴用：38mm
- ロックタイト 242、または同等のネジロック剤（フラッシュマウントの場合）
- 結束バンド

1.3 取付け場所

GPS 受信機を装備するときは、以下の点に留意してください。

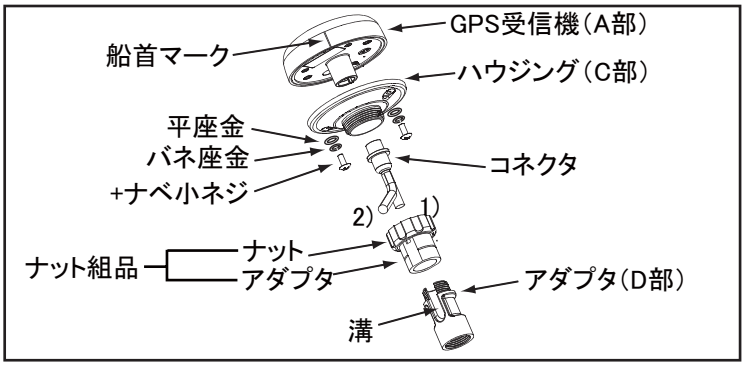
- 周囲に障害物のないところを選ぶ。
- 水しぶきが当たらないところを選ぶ。
  水しぶきが当たると、水が凍って GPS 信号を受信しにくくなる可能性があります。
- VHF 無線機、インマルサットアンテナ、レーダー、他のアンテナから離れたところを選ぶ。
  本機と他の機器との距離は、下図を参考にしてください。
- レーダービームから外れたところを選ぶ。
  レーダービームは GPS 信号の受信を妨害する恐れがあります。
- 十分に高いところを選ぶ。
  フラッシュマウント、デッキマウント：取付面水平
  パイプマウント：パイプが垂直
- ヨットの場合、マストの頂上に取り付けない。
  揺れで正確な位置測定ができなくなる恐れがあります。
- 踏んだりつまずいたりするような恐れのあるところに取り付けない。
- 本機の底面部も点検できるようなスペースを確保する。
- 他の電子機器や、高電圧機器からの干渉を出来るだけ受けないような位置を選ぶ。
  たとえば、レーダーや無線機、エンジン、発電機などからは少なくとも 1m は離してください。



1.4 取付け

注）パイプマウントにはパイプマウントキットを使用し、デッキマウントにはデッキマウントキットを使用し、フラッシュマウントにはフラッシュマウントキットを使用してください。パイプマウントにフラッシュマウントキットを使用すると、漏水の原因となります。

1.4.1 パイプマウント

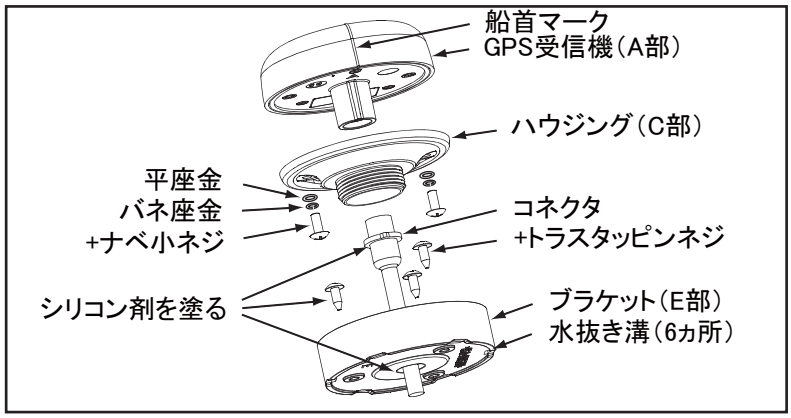


支給のナット組品には 1-14 UNS ネジ（ユニファイネジ）が切ってあり、受信機ハウジングおよびパイプに取り付けることができます。装備する前に、パイプを船体に固定します。

1. ブラケット（E 部、1.4.2 項のイラスト参照）からハウジング（C 部）を外します。
2. GPS 受信機ソケット（受信機の底面）からラベルをはがします（ラベルは廃棄）。
3. 支給の平座金（2 個）、バネ座金（2 個）、+ ナベ小ネジ（2 本）を使って、GPS 受信機（A 部）にハウジング（C 部）を固定します。
   ネジのトルクは 1.35Nm です。
4. ケーブルをパイプの中心から出すか、横（溝）から出すかを決め、ケーブルの 5 ピンコネクタ側をナット組品（ナットとアダプタ）の上から通します。
   このときはまだ、GPS 受信機を接続しません。
   1) 中心から出す場合：パイプにケーブルのコネクタを通します。このとき、ナット組品より約 10cm 長くケーブルを出してください。
   2) 横（溝）から出す場合：ケーブルはアダプタ（D 部）の溝を通し、ナット組品はアダプタ（D 部）の上に取り付けます。必ず手で取り付け、あまりきつく締めないでください。
      注 1）支給のアダプタを使用してください。縁がなめらかなので、ケーブルを傷つけません。
      注 2）ネジロック剤を使用する場合は、テフロンパイプ用ネジテープを使用してください。液状のネジロック剤は使用しないでください。プラスチックを弱め、ふくらんでひびが入る恐れがあります。
5. パイプにアダプタ（D 部）を取り付けます。
   ナットは必ず手で回し、締めすぎないように注意してください。
6. コネクタの保護キャップを外し、GPS 受信機にケーブルのコネクタをしっかりと差し込みます。
   受信機を取り外したときにコネクタを保護するため、キャップは保管しておいてください。

7. GPS 受信機の船首マークを前方に向けて、ハウジングをナットで固定します。
   ナットは必ず手で回し、締めすぎないように注意してください。

1.4.2 デッキマウント

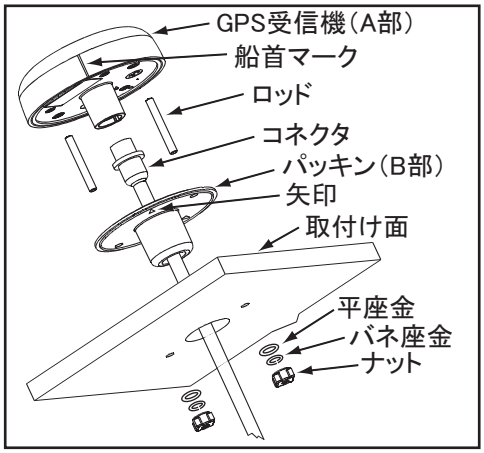


巻末の外寸図を参考に取り付けてください。

1. ブラケット（E 部）からハウジング（C 部）を外します。
2. GPS 受信機ソケット（受信機の底面）からラベルをはがします（ラベルは廃棄）。
3. 支給の平座金（2 個）、バネ座金（2 個）、+ ナベ小ネジ（2 本）を使って、GPS 受信機（A 部）にハウジング（C 部）を固定します。
   ネジのトルクは 1.35Nm です。
4. 手順 3 で組み合わせた GPS 受信機 / ハウジングにブラケット（E 部）をねじ込み、鉛筆でブラケットに船首マーク位置の印を付け、ブラケットを外します。
5. 鉛筆で付けた印を船首方向に向けて、装備場所にブラケットを配置し、+ トラスタッピンネジ（3 本）とケーブルを通す穴の位置を印します。
6. 3mm の錐を使って下穴を 3ヵ所、および 25mm の錐を使ってケーブル穴を 1ヵ所開けます。
   グラスファイバーの場合、ゲルコートがしみこむまで、逆側からドリルで穴を開け、表面のひびを最小限におさえます。
7. 上の図を参考に、ブラケット（E 部）にシリコン剤を塗ります。
8. 3 本の + トラスタッピンネジ にシリコン剤を塗ります。
9. 鉛筆で付けた印が船首方向になるようにして、所定の場所にブラケットを固定します。
   水抜き溝をふさがないでください。ブラケット内に水がたまるのを防ぐためのものです。
   注）液体のシリコン剤は使用しないでください。プラスチックを弱め、ふくらんでひびが入る恐れがあります。
10. ハウジングのネジの周りにパイプ用ネジテープを 2 回巻き付けます。
11. コネクタにシリコン剤を塗ります。
12. ケーブルの 5 ピンコネクタ側をブラケットの穴に上から通します。
13. コネクタの保護キャップを外し、GPS 受信機にケーブルをしっかりと差し込みます。
    受信機を取り外したときにコネクタを保護するため、キャップは保管しておいてください。

14. ケーブルを左回りに 3 回半ねじり、ハウジングに GPS 受信機を固定します。
    ナットは必ず手で回し、締めすぎないように注意してください。

1.4.3 フラッシュマウント



巻末の外寸図を参考に取り付けてください。

1. GPS 受信機ソケットからラベルをはがします（ラベルは廃棄）。
2. 支給のロッド（寸切りボルト：2 本）に取外し可能なネジロック剤を塗り、GPS 受信機（A 部）の底面からロッドをねじ込みます。
3. パッキン（B 部）の矢印を船首方向に向けて、装備場所に配置し、取付け穴（2 個）とケーブルを通す穴の位置に印を付けます。
4. 6mm の錐を使ってロッド取付け穴を 2ヵ所 , および 38mm の錐を使ってケーブル穴を 1ヵ所開けます。
   グラスファイバーの場合、ゲルコートがしみこむまで、逆側からドリルで穴を開け、表面のひびを最小限におさえます。
5. ケーブルの 5 ピンコネクタ側をパッキンの上から通し、船体に開けたケーブル穴に通します。
6. GPS 受信機にケーブルを差し込みます。
7. パッキンの矢印を船首マークと同じ方向に向けてパッキンをロッドにはめ込み、コネクタを固定します。
   注）パッキンは一方向にしか入りません。パッキンの溝が船首マークに合うようにはめ込んでください。
8. GPS 受信機の船首マークを前方にして、ロッドを船体の取付け面にはめ込みます。
9. 取付け面の下側から平座金（2 個）、バネ座金（2 個）、ナット（2 個）を使って、ロッドを固定します。
   ナットは必ず手で回し、締めすぎないように注意してください。
10. GPS 受信機と取付け面に隙間がなくなるように、GPS 受信機の周りにシリコン剤を塗布します。

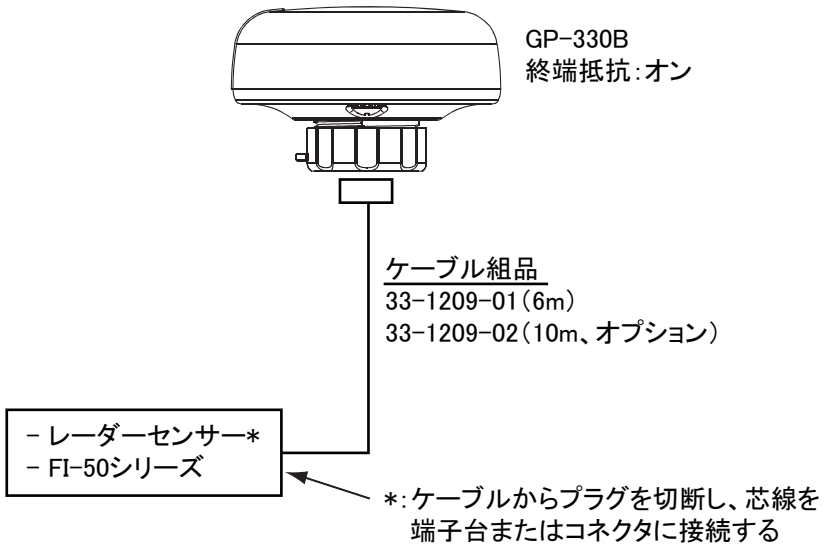
2 章　結線

2.1　CAN bus との接続

本機の LEN（Load Equivalency Number）は 2 です。LEN とは、CAN bus から供給される電源において、機器が消費する電流の単位で、CAN bus ネットワークの設計に重要なものです。

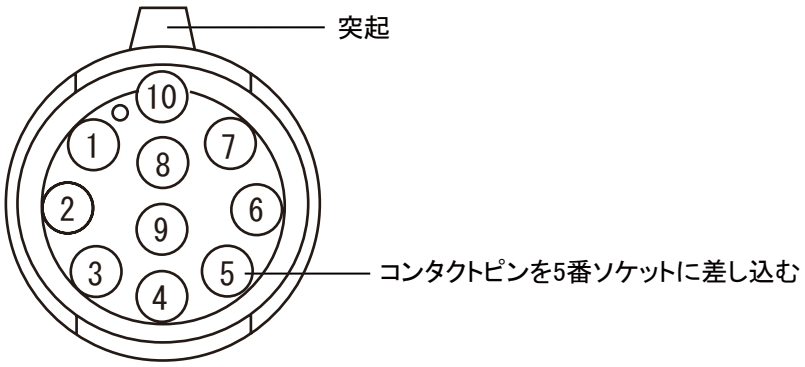
2.1.1　単独接続

本機を CAN bus フォーマット機器と直接接続します。このとき終端抵抗をオンにします。ケーブルが長すぎる場合は、ループに巻いて結束バンドでしばっておきます。



本機の終端抵抗

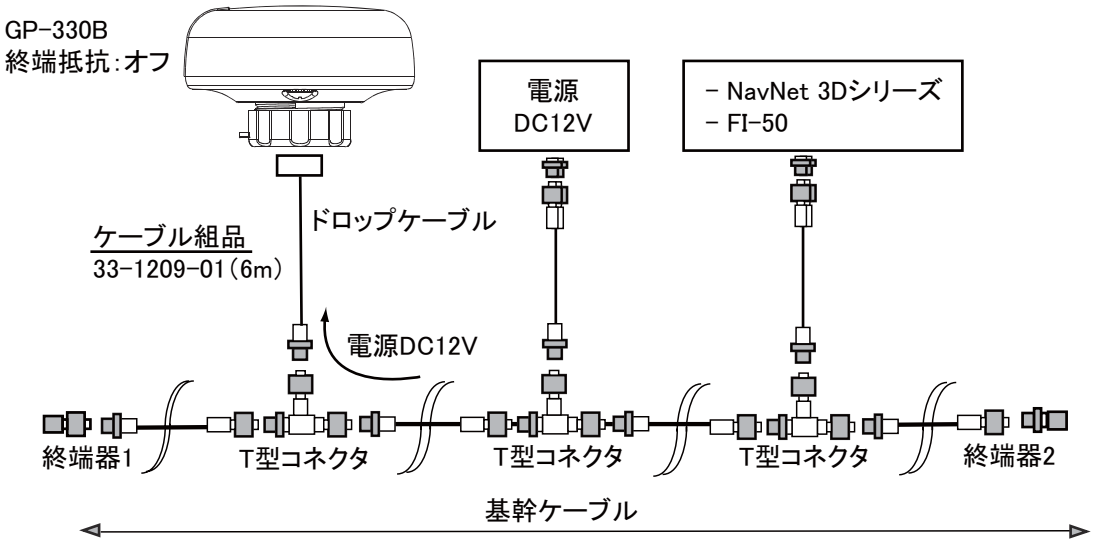
コネクタの 5 番ソケットにコンタクトピン（工事材料）を差し込むと、本機の終端抵抗がオンになります。



2.1.2 ネットワーク接続

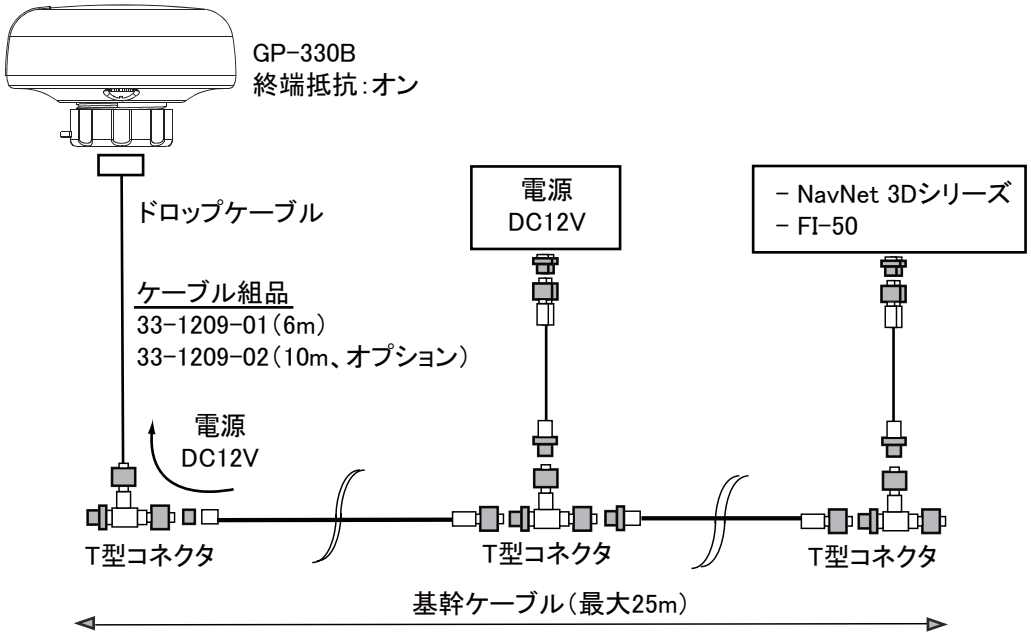
基幹（バックボーン）ケーブルの途中に接続

本機のケーブル（ドロップケーブル）を CAN bus ネットワークの T 型コネクタ（LTWSS-050505-FMF-TS001、あるいは同等品）に接続します。基幹ケーブルにはライトケーブル（軽量タイプ）が使用できます。基幹ケーブルの両端に終端器を取り付けます。CAN bus ネットワークでは 2 つの終端器を取り付けてください。3 つ以上取り付けると性能が低下します。本機の終端抵抗はオフのままにします。



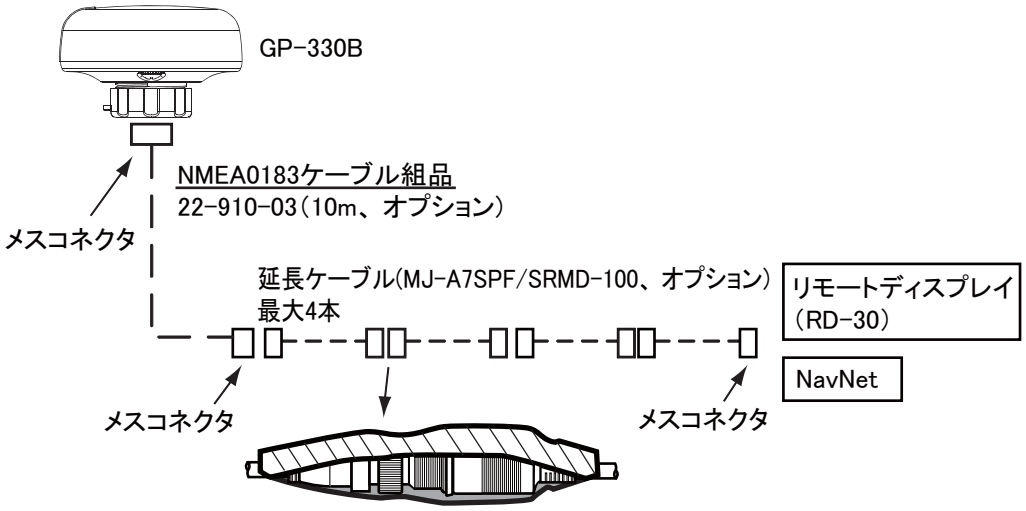
基幹ケーブルの端に接続

基幹ケーブルの端のノードの T 型コネクタに GP-330B を接続する場合は、本機の終端抵抗をオンにします。



2.2 NMEA0183 との接続

結線図



配線

本機から NMEA0183 フォーマットの機器まで配線します。ケーブルは最大 50m まで延長可能です。ケーブルが長すぎる場合は、ループに巻いて結束バンドでしばっておきます。

2.3 NavNet との接続

本機を NavNet に接続した場合、下記の設定を行ってください。操作手順などの詳細については、NavNet の装備要領書を参照してください。

航法装置設定メニュー

[外部航法装置選択] を [古野 GPS センサー] または [全て] に設定します。

GPS センサー設定メニュー

- 測地系：チャートの種類を選択します。WGS-84 が GPS の標準です。
- 測位モード：[2D/3D] に設定します。([2D/3D]：2 次元測位 (3 個の衛星)、あるいは 3 次元測位（4 個の衛星)）
- GPS コールドスタート：現在持っているアルマナックデータを消去してから測位を開始します。

WAAS 設定メニュー

- WAAS 受信：WAAS 測位を行うときは [する] を選択します。
- WAAS 衛星選択：WAAS 衛星の選択方法を [自動] に設定します。

3 章　保守点検

⚠ 注 意
分解・改造は絶対しないこと。 防水シールがはがれる恐れがあります。また、火災、感電、ケガの原因になります。
水没させたり、高圧洗浄はしないこと。 機器内部のセンサーが水没により、故障の原因になります。

ご注意
塗料、防錆剤、接点復活剤などは有機溶剤を含んでいるので、機器の塗装部分や樹脂部品には使用しないでください。 機器の塗装部分や樹脂部品を劣化させることがあります。特に、樹脂のコネクタに使用すると破損する恐れがありますので絶対に使用しないでください。

3.1　ふだんの保守点検

GP-330B はほとんどお手入れする必要はありませんが、定期的に水を湿らせた布でこびりついた汚れや水あかをふいてください。

3.2　故障かなと思ったら

故障かなと思ったら、まず次のような点検を行ってください。

- GPS 受信機に電源が入っているか。（GP-330B に電源を供給している機器をチェックする。）
- すべての機器が確実に接続されているか。
- GPS 受信機の周りに障害物がないか。
- 他のアンテナや機器からの干渉はないか。
- ケーブルが傷んでいないか。
- GPS 受信機が傷付いていないか。
- GPS 受信機に着氷していないか。

4 章　入出力センテンス、PGN

4.1　NMEA0183 センテンス

本機で採用している NMEA0183 の出力センテンスは以下のとおりです。

$GPDTM*	測地系
$GPGGA*	GPS の測位状況
$GPGLL*	緯度・経度
$GPGSA	GPS の DOP 値と衛星番号
$GPGSV	視界内の衛星情報
$GPRMC*	GPS 航法情報
$GPVTG*	進路、対地船速
$GPZDA*	UTC 時刻、日付
$PFEC,pidat	$PFEC,pireq への応答

*: デフォルト出力

4.2 NMEA2000 PGN

本機で採用している NMEA2000 の PGN（パラメータグループナンバー）は以下のとおりです。

送信

PGN059392	応答
PGN060928	アドレス要求
PGN065285	起動状態応答（メーカー独自）
PGN065287	アクセスレベル（メーカー独自）
PGN126208	要求 / 命令応答グループ機能
PGN126464	送受信 PGN リスト
PGN126720	アドレス可能マルチフレーム（メーカー独自）
PGN126992	システム時刻
PGN126996	製品情報
PGN126998	構成情報
PGN127258	磁気偏差
PGN129025	緯度・経度
PGN129026	対地船速、進路
PGN129029	GNSS 測位位置
PGN129033	UTC 時刻、日付
PGN129044	測地系
PGN129538	GNSS 受信機パラメータ
PGN129539	DOP 値（HDOP、VDOP、TDOP）
PGN129540	視界内 GNSS 衛星情報

入力

PGN059904	要求
PGN060928	アドレス要求
PGN126208	要求グループ機能
PGN126208	命令グループ機能
PGN126720	アドレス可能マルチフレーム（メーカー独自）

GPS 受信機　GP-330B　仕様

１．総合

(1) 受信周波数	1575.42 MHz
(2) 受信コード	C/A コード、WAAS
(3) チャンネル数	GPS: 65 チャンネル、12 衛星追尾、パラレル
	WAAS: 1 チャンネル
(4) 測位精度	GPS: 10 m 以下 (2drms)
	WAAS: 3 m 以下 (2drms)
(5) 初期捕捉時間	約 60 秒（コールドスタート時)
(6) 追尾速度	999 kn
(7) 測位更新周期	1 秒（標準）、0.1 秒（最小）

２．インターフェイス

(1) データの種類	CAN bus または NMEA0183 Ver.3.1（ケーブル選択）
(2) データセンテンス (NMEA0183)	
出力	DTM, GGA, GLL, GSA, GSV, RMC, VTG, ZDA
(3) CAN bus PGN (NMEA2000)	
入力	059904, 060928, 126208/720
出力	059392, 060928, 065281/285/287,126208/464/720/992/996/998
	127258, 129025/026/029/033/044/538/539/540, 130822/823/944

３．電源

DC 12 V: 90 mA 以下

４．環境条件

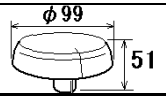
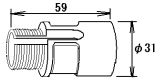
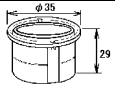
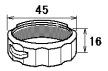
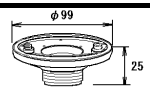
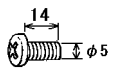
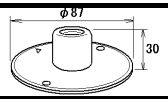
(1) 使用温度範囲	－25℃ ～＋55℃
(2) 相対湿度	95%以下（＋40℃）
(3) 保護等級	IP56
(4) 振動	IEC60945 Ed.4

５．ユニットカラー

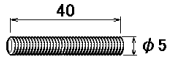
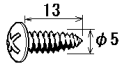
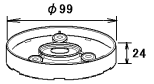
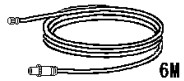
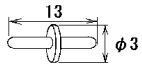
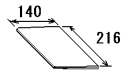
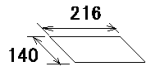
N9.5

J4452S01E
130125

PACKING LIST GP-330B-A

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
GPS受信機 GPS RECEIVER		GP-330B 000-012-580-00	1
ﾊﾟｲﾌﾟﾏｳﾝﾄｷｯﾄ PIPE MOUNT KIT.			
ｱﾀﾞﾌﾟﾀｰ CABLE SIDE-EXIT ADAPTOR		04-673-01 000-168-927-10	1
ｱﾀﾞﾌﾟﾀｰ ADAPTOR		04-564-01 000-168-926-10	1 (*2)
ﾅｯﾄ CAPTIVE NUT		04-565-01 000-168-925-10	1 (*2)
ﾊｳｼﾞﾝｸﾞ MOUNT BASE		04-670-01 000-168-928-10	1 (*1)
+ﾅﾍﾞｺﾈｼﾞ PANHEAD SCREW		03-317-01 000-160-544-10	2
ﾊﾞﾈ座金 SPRING WASHER		03-314-01 000-160-545-10	2
平座金 FLAT WASHER		03-312-01 000-160-546-10	2
ﾌﾗｯｼｭﾏｳﾝﾄｷｯﾄ FLUSH MOUNT KIT.			
ﾅｯﾄ THUMB NUT		20-613-01 000-168-934-10	2 (*3)
ﾊﾟｯｷﾝ GASKET		04-672-01 000-168-932-10	1

(*1),(*2),(*3)は、それぞれ組立てられています。
(*1),(*2),(*3) PRE-ASSEMBLED.

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾛｯﾄﾞ STUD		03-282-01 000-168-933-10	2 (*3)
ﾃﾞｯｷﾏｳﾝﾄ DECK MOUNT KIT.			
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ SELF-TAPPING SCREW		#10X1/2 000-168-931-10	3
ﾌﾞﾗｹｯﾄ SURFACE BRACKET		04-691-01 000-168-930-10	1 (*1)
工事材料 INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ(ｸﾐﾋﾝ) NMEA2000 CABLE ASSEMBLY		33-1209-01 *6M* 001-193-460-10	1
ｺﾝﾀｸﾄﾋﾟﾝ CONTACT PIN		05-251-01 000-168-935-10	2
図書 DOCUMENT			
取扱説明書J/E OPERATOR'S MANUAL(JP/EN)		OMC-44520-* 000-168-896-1*	1
埋め込みｷｯﾄ注意書 FLUSH MOUNTING NOTICE		C42-01005-* 000-174-531-1*	1

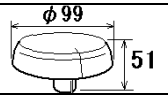
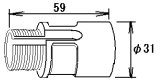
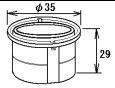
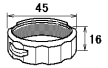
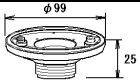
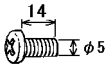
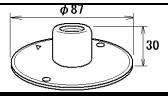
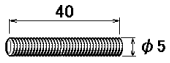
A-1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

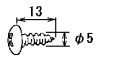
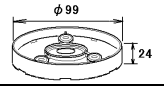
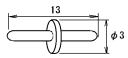
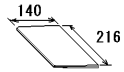
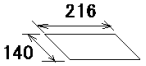
型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

PACKING LIST GP-330B-N

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
GPS受信機 GPS RECEIVER		GP-330B 000-012-580-00	1
ﾊﾟｲﾌﾟﾏｳﾝﾄｷｯﾄ PIPE MOUNT KIT.			
ｱﾀﾞﾌﾟﾀｰ CABLE SIDE-EXIT ADAPTOR		04-673-01 000-168-927-10	1
ｱﾀﾞﾌﾟﾀｰ ADAPTOR		04-564-01 000-168-926-10	1 (*2)
ﾅｯﾄ CAPTIVE NUT		04-565-01 000-168-925-10	1 (*2)
ﾊｳｼﾞﾝｸﾞ MOUNT BASE		04-670-01 000-168-928-10	1 (*1)
+ﾅﾍﾞｺﾈｼﾞ PANHEAD SCREW		03-317-01 000-160-544-10	2
ﾊﾞﾈ座金 SPRING WASHER		03-314-01 000-160-545-10	2
平座金 FLAT WASHER		03-312-01 000-160-546-10	2
ﾌﾗｯｼｭﾏｳﾝﾄｷｯﾄ FLUSH MOUNT KIT.			
ﾊﾟｯｷﾝ GASKET		04-672-01 000-168-932-10	1
ﾛｯﾄﾞ STUD		03-282-01 000-168-933-10	2 (*3)

(*1),(*2),(*3)は、それぞれ組立てられています。
(*1),(*2),(*3) PRE-ASSEMBLED.

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾅｯﾄ THUMB NUT		20-613-01 000-168-934-10	2 (*3)
ﾃﾞｯｷﾏｳﾝﾄ DECK MOUNT KIT.			
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ SELF-TAPPING SCREW		#10X1/2 000-168-931-10	3
ﾌﾞﾗｹｯﾄ SURFACE BRACKET		04-691-01 000-168-930-10	1 (*1)
工事材料 INSTALLATION MATERIALS			
ｺﾝﾀｸﾄﾋﾟﾝ CONTACT PIN		05-251-01 000-168-935-10	2
図書 DOCUMENT			
取扱説明書J/E OPERATOR'S MANUAL(JP/EN)		OMC-44520-* 000-168-896-1*	1
埋め込みｷｯﾄ注意書 FLUSH MOUNTING NOTICE		C42-01005-* 000-174-531-1*	1

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

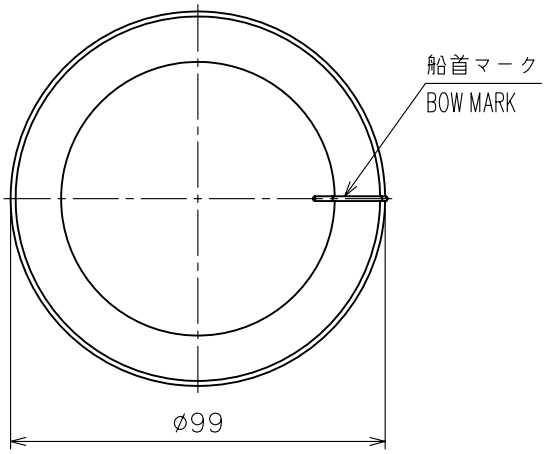
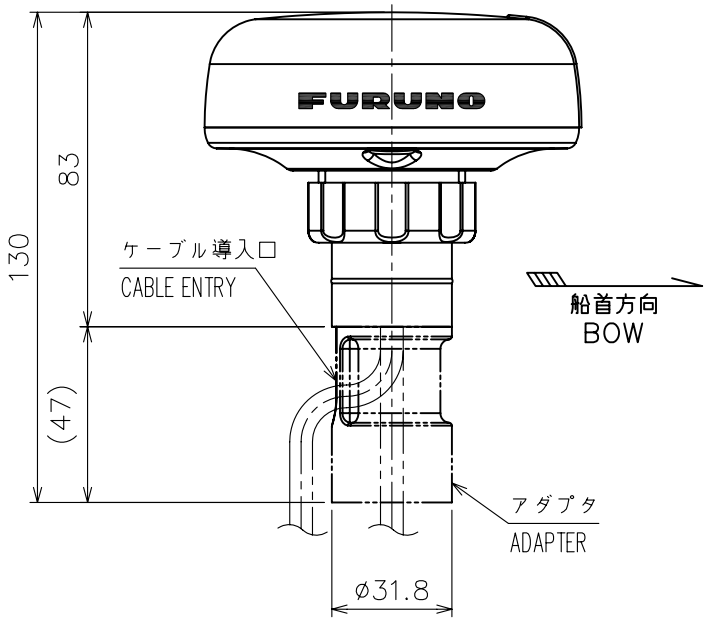
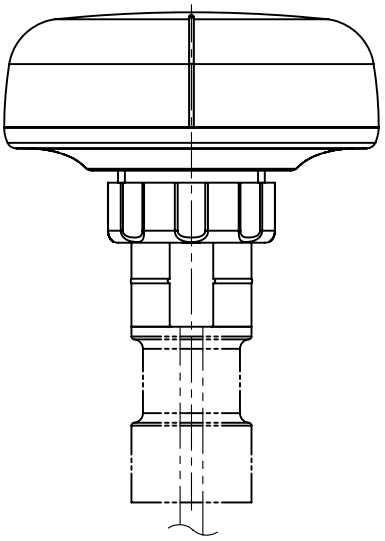


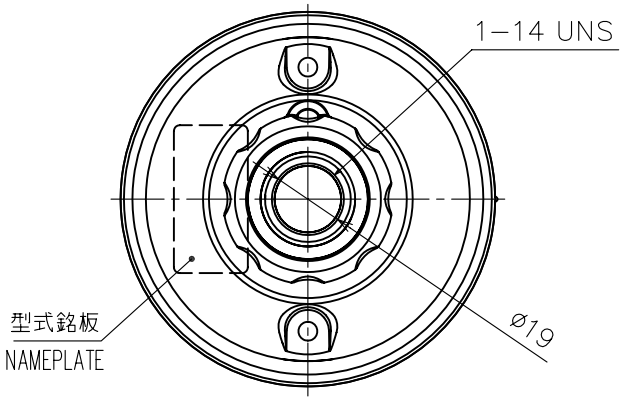
表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5





FRONT VIEW



注 記

1）指定外の寸法公差は表1による。

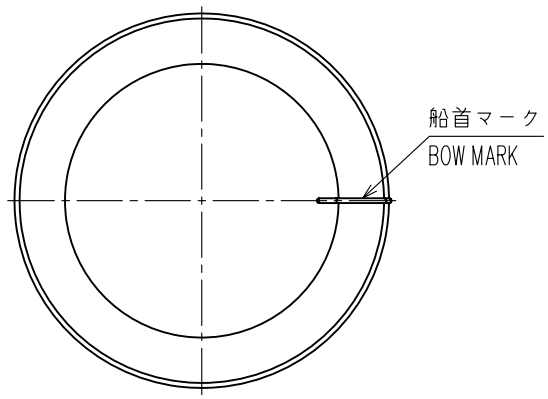
NOTE

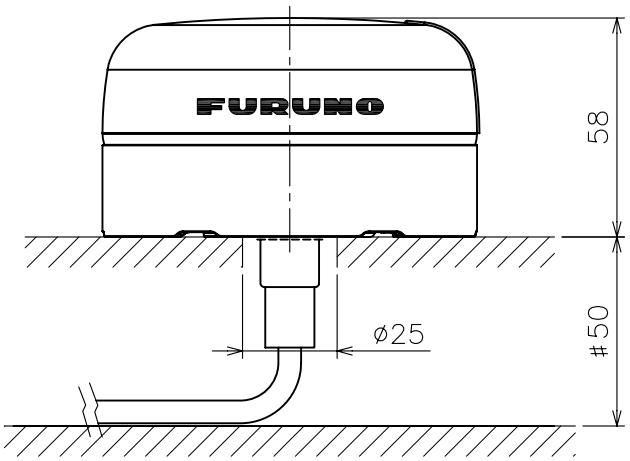
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

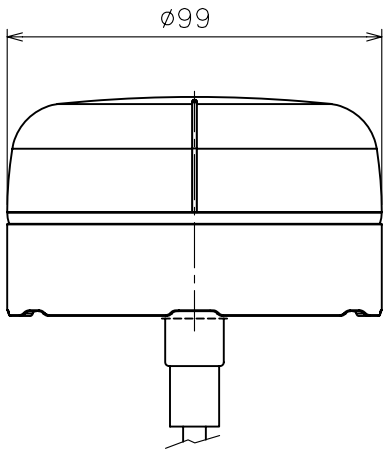
DRAWN 10/Mar/08 T.YAMASAKI		TITLE	GP-330B
CHECKED 10/Mar/08 T.TAKENO		名称	GPS受信機（パイプ装備）
APPROVED 18/Mar/08 R. Esumi			外寸図
SCALE / MASS 0.18 ±10% kg		NAME	GPS RECEIVER (PIPE MOUNT)
DWG.No. C4452-G01- A	REF.No. 20-034-100G-0		OUTLINE DRAWING

表 1　TABLE 1

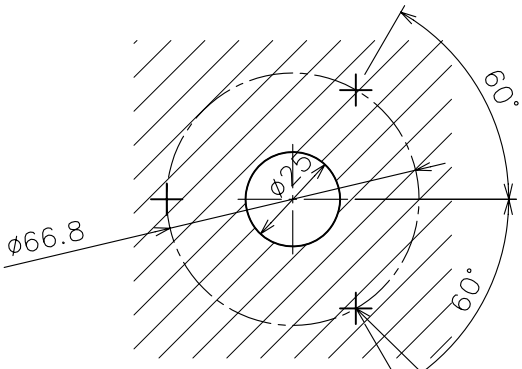
寸法区分（mm） DIMENSON	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5



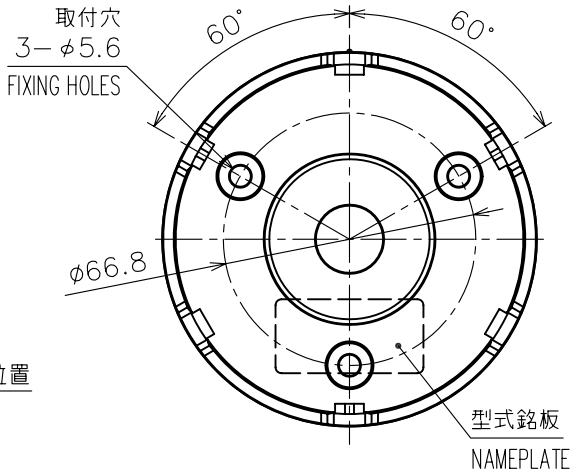




FRONT VIEW



取付穴寸法図
MOUNTING DIMENSIONS



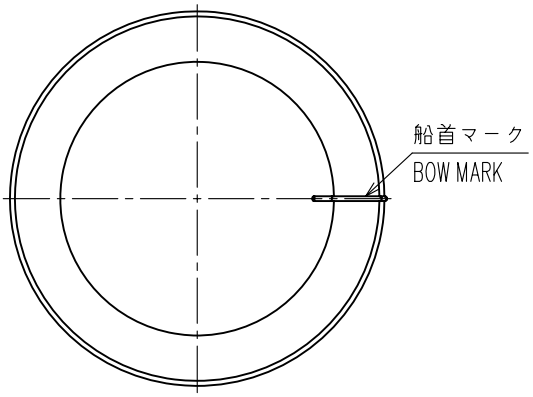
注　記　1）　指定外の寸法公差は表 1 による。
　　2）　＃印寸法は最小サービス空間寸法とする。
　　3）　取付用ネジはタッピンネジ呼び径5を使用のこと。

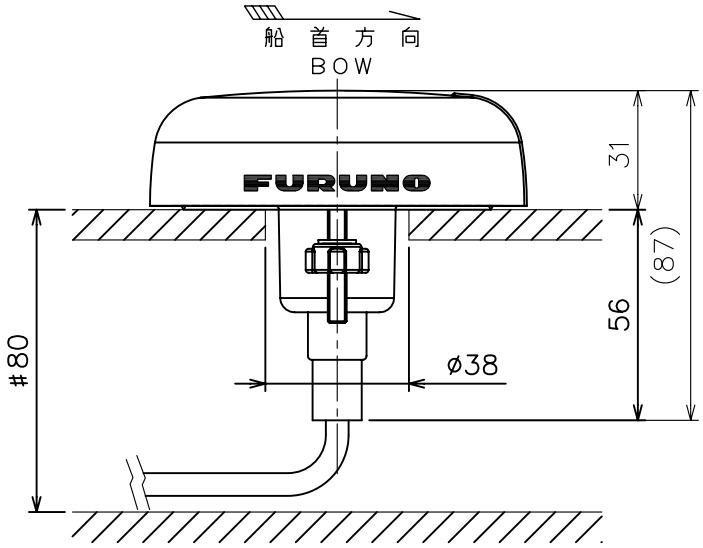
NOTE　1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　2.　#: MINIMUM SERVICE CLEARANCE.
　　3.　USE TAPPING SCREWS ø5 FOR FIXING THE UNIT.

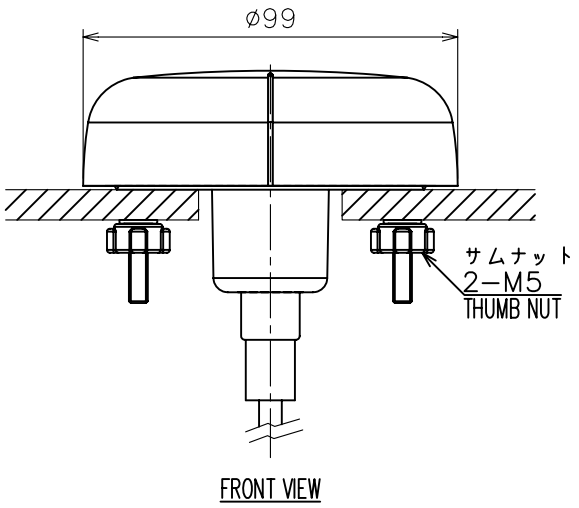
DRAWN 10/Mar/08 T.YAMASAKI		TITLE	GP-330B
CHECKED 10/Mar/08 T.TAKENO		名称	GPS受信機（デッキ装備）
APPROVED 18/Mar/08 R. Esumi			外寸図
SCALE / MASS 0.22 ±10% kg		NAME	GPS RECEIVER (DECK MOUNT)
DWG.No. C4452-G02- A	REF.No. 20-034-1106-0		OUTLINE DRAWING

表 1　TABLE 1

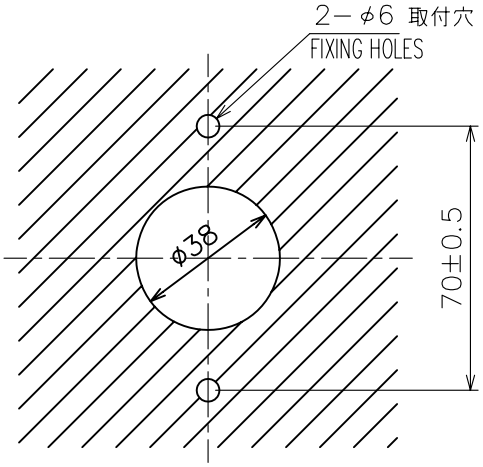
寸法区分（mm） DIMENSON	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5



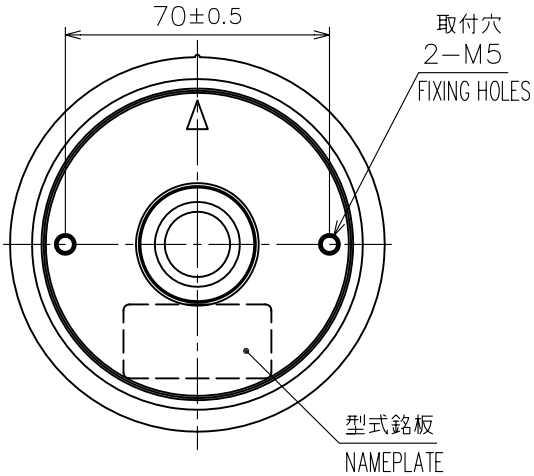




FRONT VIEW



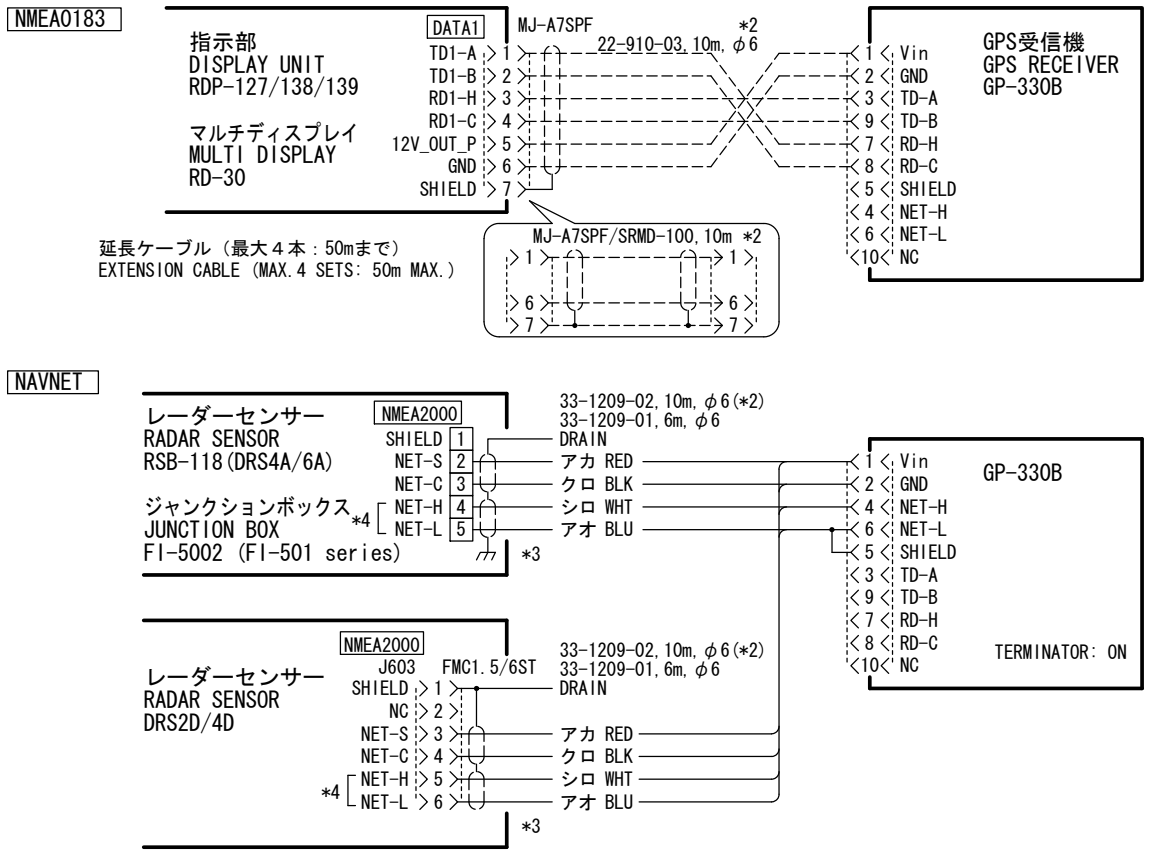
取付穴寸法図
MOUNTING DIMENSIONS



注　記　1）　指定外の寸法公差は表１による。
　　2）　＃印寸法は最小サービス空間寸法とする。
　　3）　取付にはＭ５×４０寸切りボルトを使用のこと。

NOTE　1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　2.　#: MINIMUM SERVICE CLEARANCE.
　　3.　USE M5×40 STUD BOLTS FOR FIXING THE UNIT.

DRAWN 10/Mar/08 T.YAMASAKI		TITLE	GP-330B
CHECKED 10/Mar/08 T.TAKENO		名称	GPS受信機（埋込装備）
APPROVED 18/Mar/08 R.Esumi			外寸図
SCALE	MASS 0.16 ±10% kg	NAME	GPS RECEIVER (FLUSH MOUNT)
DWG.No. C4452-G03- A	REF.No. 20-034-120G-0		OUTLINE DRAWING



注記
＊１）造船所手配。
＊２）オプション。
＊３）プラグを切断して各線を端子（コネクタピン）に接続する。
＊４）終端抵抗を接続する。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: CUT PLUG OFF FROM CABLE AND CONNECT WIRES TO TERMINAL/CONNECTOR.
*4: ATTACH A TERMINATOR.

DRAWN 13/Jun/2012 T.YAMASAKI		TITLE	GP-330B
CHECKED 13/Jun/2012 H.MAKI		名称	GPS受信機
APPROVED 14/Jun/2012 Y.NISHIYAMA			相互結線図
SCALE / MASS kg		NAME	GPS RECEIVER
DWG.No. C4452-C01- F	REF.No.		INTERCONNECTION DIAGRAM

FURUNO Worldwide Warranty for Pleasure Boats (Except North America)

This warranty is valid for products manufactured by Furuno Electric Co. (hereafter FURUNO) and installed on a pleasure boat. Any web based purchases that are imported into other countries by anyone other than a FURUNO certified dealer may not comply with local standards. FURUNO strongly recommends against importing these products from international websites as the imported product may not work correctly and may interfere with other electronic devices. The imported product may also be in breach of the local laws and mandated technical requirements. Products imported into other countries as described previously shall not be eligible for local warranty service.

For products purchased outside of your country please contact the national distributor of Furuno products in the country where purchased.

This warranty is in addition to the customer´s statutory legal rights.

1. Terms and Conditions of Warranty

FURUNO guarantees that each new FURUNO product is the result of quality materials and workmanship. The warranty is valid for a period of 2 years (24 months) from the date of the invoice, or the date of commissioning of the product by the installing certified dealer.

2. FURUNO Standard Warranty

The FURUNO standard warranty covers spare parts and labour costs associated with a warranty claim, provided that the product is returned to a FURUNO national distributor by prepaid carrier.

The FURUNO standard warranty includes:

- Repair at a FURUNO national distributor
- All spare parts for the repair
- Cost for economical shipment to customer

3. FURUNO Onboard Warranty

If the product was installed/commissioned and registered by a certified FURUNO dealer, the customer has the right to the onboard warranty.

The FURUNO onboard warranty includes

- Free shipping of the necessary parts
- Labour: Normal working hours only
- Travel time: Up to a maximum of two (2) hours
- Travel distance: Up to a maximum of one hundred and sixty (160) KM by car for the complete journey

4. Warranty Registration

For the Standard Warranty - presentation of product with serial number (8 digits serial number, 1234-5678) is sufficient. Otherwise, the invoice with serial number, name and stamp of the dealer and date of purchase is shown.

For the Onboard Warranty your FURUNO certified dealer will take care of all registrations.

5. Warranty Claims

For the Standard Warranty - simply send the defective product together with the invoice to a FURUNO national distributor.
For the Onboard Warranty – contact a FURUNO national distributor or a certified dealer. Give the product´s serial number and describe the problem as accurately as possible.

Warranty repairs carried out by companies/persons other than a FURUNO national distributor or a certified dealer is not covered by this warranty.

6. Warranty Limitations

When a claim is made, FURUNO has a right to choose whether to repair the product or replace it.

The FURUNO warranty is only valid if the product was correctly installed and used. Therefore, it is necessary for the customer to comply with the instructions in the handbook. Problems which result from not complying with the instruction manual are not covered by the warranty.

FURUNO is not liable for any damage caused to the vessel by using a FURUNO product.

The following are excluded from this warranty:

a. Second-hand product

b. Underwater unit such as transducer and hull unit

c. Routine maintenance, alignment and calibration services.

d. Replacement of consumable parts such as fuses, lamps, recording papers, drive belts, cables, protective covers and batteries.

e. Magnetron and MIC with more than 1000 transmitting hours or older than 12 months, whichever comes first.

f. Costs associated with the replacement of a transducer (e.g. Crane, docking or diver etc.).

g. Sea trial, test and evaluation or other demonstrations.

h. Products repaired or altered by anyone other than the FURUNO national distributor or an authorized dealer.

i. Products on which the serial number is altered, defaced or removed.

j. Problems resulting from an accident, negligence, misuse, improper installation, vandalism or water penetration.

k. Damage resulting from a force majeure or other natural catastrophe or calamity.

l. Damage from shipping or transit.

m. Software updates, except when deemed necessary and warrantable by FURUNO.

n. Overtime, extra labour outside of normal hours such as weekend/holiday, and travel costs above the 160 KM allowance

o. Operator familiarization and orientation.

FURUNO Electric Company, March 1, 2011

FURUNO Warranty for North America

FURUNO U.S.A., Limited Warranty provides a twenty-four (24) months LABOR and twenty-four (24) months PARTS warranty on products from the date of installation or purchase by the original owner. Products or components that are represented as being waterproof are guaranteed to be waterproof only for, and within the limits, of the warranty period stated above. The warranty start date may not exceed eighteen (18) months from the original date of purchase by dealer from Furuno USA and applies to new equipment installed and operated in accordance with Furuno USA's published instructions.

Magnetrons and Microwave devices will be warranted for a period of 12 months from date of original equipment installation.

Furuno U.S.A., Inc. warrants each new product to be of sound material and workmanship and through its authorized dealer will exchange any parts proven to be defective in material or workmanship under normal use at no charge for a period of 24 months from the date of installation or purchase.

Furuno U.S.A., Inc., through an authorized Furuno dealer will provide labor at no cost to replace defective parts, exclusive of routine maintenance or normal adjustments, for a period of 24 months from installation date provided the work is done by Furuno U.S.A., Inc. or an AUTHORIZED Furuno dealer during normal shop hours and within a radius of 50 miles of the shop location.

A suitable proof of purchase showing date of purchase, or installation certification must be available to Furuno U.S.A., Inc., or its authorized dealer at the time of request for warranty service.

This warranty is valid for installation of products manufactured by Furuno Electric Co. (hereafter FURUNO). Any purchases from brick and mortar or web-based resellers that are imported into other countries by anyone other than a FURUNO certified dealer, agent or subsidiary may not comply with local standards. FURUNO strongly recommends against importing these products from international websites or other resellers, as the imported product may not work correctly and may interfere with other electronic devices. The imported product may also be in breach of the local laws and mandated technical requirements. Products imported into other countries, as described previously, shall not be eligible for local warranty service.

For products purchased outside of your country please contact the national distributor of Furuno products in the country where purchased.

WARRANTY REGISTRATION AND INFORMATION

To register your product for warranty, as well as see the complete warranty guidelines and limitations, please visit www.furunousa.com and click on "Support". In order to expedite repairs, warranty service on Furuno equipment is provided through its authorized dealer network. If this is not possible or practical, please contact Furuno U.S.A., Inc. to arrange warranty service.

FURUNO U.S.A., INC.
Attention: Service Coordinator
4400 N.W. Pacific Rim Boulevard
Camas, WA 98607-9408
Telephone: (360) 834-9300
FAX: (360) 834-9400

Furuno U.S.A., Inc. is proud to supply you with the highest quality in Marine Electronics. We know you had several choices when making your selection of equipment, and from everyone at Furuno we thank you. Furuno takes great pride in customer service.

FURUNO ELECTRIC CO., LTD.
9-52 Ashihara-cho, Nishinomiya, 662-8580, Japan
Tel: +81 (798) 65-2111 Fax: +81 (798) 65-4200
www.furuno.co.jp

Publication No. DOCQA0377

Declaration of Conformity

CE

We FURUNO ELECTRIC CO., LTD.

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

declare under our sole responsibility that the product

GPS RECEIVER GP-330B*

(Model name, type number)

*: GP-330B is supplied by AIRMAR technology Corporation on an OEM basis and is mechanically and electronically identical to their G2183.

is in conformity with the essential requirements as described in Article 10.3 and Annex II of the Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment (R&TTE Directive) and satisfies all the technical regulations applicable to the product within this Directive

IEC 60945 Ed.4.0: 2002 EMC related items
IEC 60950-1 Ed.2.0: 2005 Safety related items
IEC 60950-1 Ed.2.0 A1: 2009 Safety related items
EN 300 440-1 V1.6.1: 2010 Spurious related items
EN 300 440-2 V1.4.1: 2010 Spurious related items
EN 301 489-1 V1.8.1:2008 EMC related items
EN 301 489-3 V1.4.1:2002 EMC related items

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see

- Declaration of conformity of January 08, 2013 issued by AIRMAR Technology Corporation, the USA.
- EMC Test Report 100974030BOX-001, November 30, 2012 prepared by Intertek Testing Services NA, Inc., the USA, and 2012-172, December 13, 2012 prepared by Core Compliance Testing Services, LLC, the USA.
- Safety Test Report FLI12-13-006, January 21, 2013 prepared by FURUNO Labotech International Co., LTD.
- Spurious Test Report FLI12-12-108, November 26, 2012 prepared by FURUNO Labotech International Co., LTD.

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
January 21, 2013

(Place and date of issue)

Yoshitaka Shogaki
Department General Manager
Quality Assurance Department

(name and signature or equivalent marking of authorized person)

ECF
(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

・ 機器の修理・使用方法等に関するお問い合わせは、お買い上げの販売店・代理店、最寄りの
当社支店・営業所あてへお願いします。

FURUNO ELECTRIC CO., LTD.
古野電気株式会社

・FURUNO Authorized Distributor/Dealer　お問い合わせは

本書の無断複写複製（コピー）は特定の
場合を除き、当社権利侵害になります。

A　: MAY 2008
D1 : SEP. 3, 2013

Printed in Japan

Pub. No. OMC-44520-D1

(ETMI)　GP-330B

00016889614